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THESIS FOR THE DEGREE OF DOCTOR OF PUBLIC HEALTH

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CORRELATION OF DEATH-RATES FROM CERTAIN DISEASES AND CERTAIN ECONOMIC AND HOUSING FACTORS IN THE PHILIPPINE ISLANDS

BY

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CORRELATION OF DEATH RATES FROM CERTAIN DISEASES AND CERTAIN ECONOMIC AND HOUSING FACTORS IN THE PHILIPPINE ISLANDS.

INTRODUCTION

In the work of a health officer there constantly arises a multiplicity of problems which cannot possibly be correctly solved without the application of modern statistical methods. Essential among these methods is correlation; and, in consequence, it is the basis upon which this investigation has been developed. Although the method of correlation is relatively new, it has proved itself to be of vital importance. "By the use of this technique, the most complicated problems, which could be attacked in no other way, may be solved." (1). While the other statistical methods are being applied to public health problems with considerable frequency these days, it can reasonably be said that the same is not true of the method of correlation. In the solution of biological, anthropological, physiological, meteorological, social and economic problems it has found application, but in the domain of vital statistics, its use, it seems, has been very scanty.

It is gratifying to realize that in its meager use

in vital statistics, it has thrown light into numerous fundamental as well as surprising inter-relationships between various phenomena.

In considering the general health conditions of a community, noting prevalence of disease, malnutrition, infant mortality, and general morbidity, etc., it is generally assumed that there must be a certain relation between these and the housing conditions or economic factors. It is possible that under the brunt of cold scientific analysis this accepted relation might not be found as intimate as generally believed. Also, there is the possibility that such a similarity of conditions might not hold universally. Inasmuch as the material herein finds its source in the Philippine Islands, it is to be appreciated that there is a variation in conditions which doubtless is in some degree responsible for the apparently contradictory results, such as are here presented.

Concretely, in the Philippine Islands, of necessity, the dwellings are of far different construction than those to be found in America or Europe. Whereas in the Occidental countries, warmth, together with protection, has to be considered in the construction of homes, in the Philippines, since there exists no need of heating the houses, they are built of a loose construction, and so they are at all times perfectly ventilated. Thus we find a fundamental difference.

The size of the family per protective area is generally taken as a criterion of "crowding" in general acceptance. In America the evil of this is mostly felt in centers of population, and it is especially among the poorer class and foreign element that this condition flourishes. In the Philippines it must be acknowledged that there could be the same number of people living under a given roof, the ratio of which would be considered "crowding" in America, and not have the same injurious effect on the health of the Filipinos, due to the difference in climate, ventilation, etc. In fact, with the poorer class, which constitutes the bulk of the population, it is a common occurence and general practice to find several families not only under the same roof but living in the same room. Consequently it would appear that with such close relationships, the possibility of inter-detrimentation would be greater than in the United States. But, the neutralizing effect that dwellings cannot be closed and have at all times perfect ventilation, must be considered. Therefore, taking figures as figures, although they could show the index of "crowding" in the United States to numerically check that of the Philippines; upon the application of the correlation method, the resulting effects may be found different, due to some minor factor. Such was actually found to be the case.

FACTORS CORRELATED

In development of this idea, by the method of correlation, certain Philippine data available was analyzed.

For simplicity and with a view to further work on this line, the diseases selected as best suited for this problem are Malaria, Smallpox, Asiatic Cholera, Dysentery, Leprosy, Beri-beri, Pulmonary Tuberculosis, and, lastly, all the diseases combined. There is an added reason in the fact that these diseases are adopted in the standard classification of the International Nomenclature of Causes of Death. Also, this classification is strictly adhered to in the annual reports of the Philippine Health Service, and is furthermore adopted in the Philippine Census of 1918. The death-rates from these diseases per 1,000 population in the various provinces have been correlated with the economic and housing factors. Thus, should the results warrant following up this problem, there would be a satisfactory basis for comparative work.

SOURCE AND NATURE OF DATA

The data in this work are drawn from the Philippine Census of 1903, taken in March of that year. The figures on economic factors, dwellings and families, therefore, represent those existing during the early part of 1903. For this year only partial and rather incomplete data on vital statistics are included, while for the year 1902, comprehensive figures are available. Inasmuch as the census gives figures on the economic, dwelling, and family factors for the early part of the year 1903, it is considered that the statistics on mortality for the year 1902, are sufficiently closely related in point of time.

Therefore, the data of vital statistics for 1902 and the figures for the economic, dwelling and family factors for the year 1903 are herein taken and analyzed in this problem.

In considering the provinces with reference to their population and relative wealth, a little difficulty presents itself. The objective is the finding of the ratio between the wealth of the provinces and their respective population, which will give a concrete measure for statistical use. Inasmuch as the determination of the income of the people is not feasable, the valuation of taxes and personal property and real estate are primarily considered. It seems fairly reasonable that the taxes paid by a community would furnish a measure of its wealth. Likewise, the valuation of the personal property and the real estate must serve the same purpose. The question that arises, however, is: to what degree can these elements be properly regarded as the measure of the economic status of the province and its people? Total taxes paid or the total value of personal property and real estate does not seem to furnish as true an index of the wealth of the community as when these values are considered with respect to the individuals inhabiting the province. Consequently, the figures have been taken on the basis of per capita, and both taxes, personal property, and real estate valuations have been used for the correlation.

The property values include personal and real property as given in the census. The taxes do not include customs collections. They do, however, cover the amount of taxes paid for insular, provincial, municipal town or city and road purposes. Both the property and tax values were estimated in the various parts of the Islands by tax assessors, appraisers, the "presidentes" * or by the owners of the property. Therefore, although they do not represent actual valuations they can reasonably be accepted as good approximations.

The word "family" is herein used in the same sense that it is employed in the United States Census, that is, "a group of persons living under one roof, or in one suite or apartment" (2). No distinction is made, however, between public and private families. A dwelling is considered as one roof, sheltering one or more families.

Certain provinces have been omitted, because of incomplete and unreliable records. Manila, being a city, is also omitted for the simple reason that conditions obtaining there are not comparable with those of the other provinces. This is particularly true in respect to the family factor in which are included a large number of institutions such as prisons, colleges, hospitals, etc. The total number of provinces included in this

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* "Presidente" is an official corresponding to the mayor in American townships or cities.

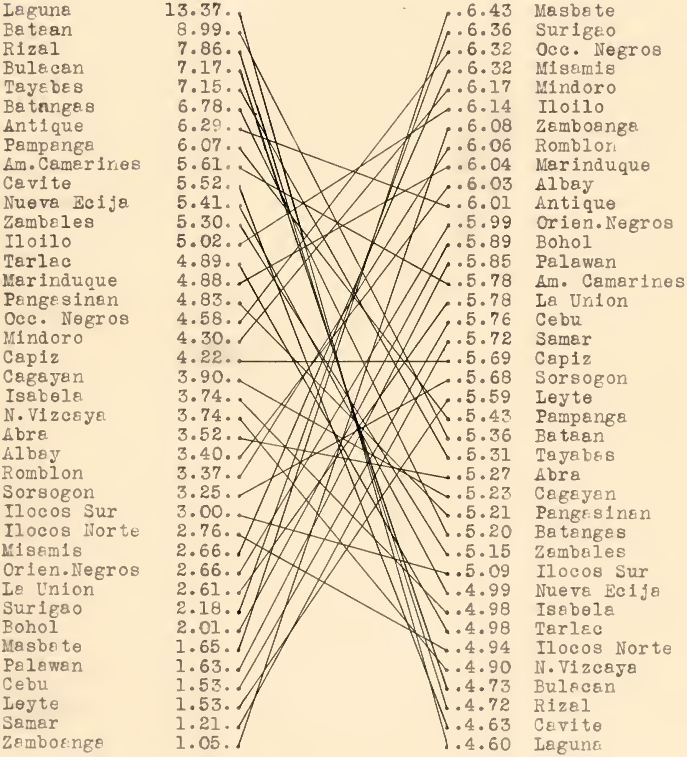
work is thirty-nine; they follow:

1 Abra
2 Albay
3 Am.Camarines
4 Antique
5 Bataan
6 Batangas
7 Bohol
8 Bulacan
9 Cagayan
10 Capiz
11 Cavite
12 Cebu
13 Ilocos Norte
14 Ilocos Sur
15 Iloilo
16 Isabela
17 Laguna
18 La Union
19 Leyte
20 Marinduque
21 Masbate
22 Mindoro
23 Misamis
24 Nueva Ecija
25 N.Vizcaya
26 Occ. Negros
27 Orien. Negros
28 Palawan
29 Pampanga
30 Pangasinan
31 Rizal
32 Romblon
33 Samar
34 Sorsogon
35 Surigao
36 Tarlac
37 Tayabas
38 Zambales
39 Zamboanga

THE CORRELATION METHOD

A brief explanation of the correlation method may be of advantage to those not familiar with it. This method was first introduced on a sound basis by Galton (3), and later elaborated by Edgeworth (4), Pearson (5), Yule (6), and others. "Two characteristics are said to be correlated when there is a tendency for the changes in the value of one to depend on the changes in the value of the other."(8). If death-rates and taxes were correlated in the various provinces, for instance, it would be found that the high death-rates occur in those provinces where the valuation of taxes is high. This is positive correlation. If, on the other hand, the high death-rates are found in provinces where the taxes are low, there is also correlation, but in this case, a negative correlation.

Chart No. I.- Correlation Between Death rate Per 1000 Population From Tuberculosis (Left Column) and Average Number of Persons to a Dwelling (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5 (appendix).



Laguna	13.37.	.6.43	Masbate
Bataan	8.99.	.6.36	Surigao
Rizal	7.86.	.6.32	Occ. Negros
Bulacan	7.17.	.6.32	Misamis
Tayabas	7.15.	.6.17	Mindoro
Batangas	6.78.	.6.14	Iloilo
Antique	6.29.	.6.08	Zamboanga
Pampanga	6.07.	.6.06	Romblon
Am.Camarines	5.61.	.6.04	Marinduque
Cavite	5.52.	.6.03	Albay
Nueva Ecija	5.41.	.6.01	Antique
Zambales	5.30.	.5.99	Orien.Negros
Iloilo	5.02.	.5.89	Bohol
Tarlac	4.89.	.5.85	Palawan
Marinduque	4.88.	.5.78	Am. Camarines
Pangasinan	4.83.	.5.78	La Union
Occ. Negros	4.58.	.5.76	Cebu
Mindoro	4.30.	.5.72	Samar
Capiz	4.22.	.5.69	Capiz
Cagayan	3.90.	.5.68	Sorsogon
Isabela	3.74.	.5.59	Leyte
N.Vizcaya	3.74.	.5.43	Pampanga
Abra	3.52.	.5.36	Bataan
Albay	3.40.	.5.31	Tayabas
Romblon	3.37.	.5.27	Abra
Sorsogon	3.25.	.5.23	Cagayan
Ilocos Sur	3.00.	.5.21	Pangasinan
Ilocos Norte	2.76.	.5.20	Batangas
Misamis	2.66.	.5.15	Zambales
Orien.Negros	2.66.	.5.09	Ilocos Sur
La Union	2.61.	.4.99	Nueva Ecija
Surigao	2.18.	.4.98	Isabela
Bohol	2.01.	.4.98	Tarlac
Masbate	1.65.	.4.94	Ilocos Norte
Palawan	1.63.	.4.90	N.Vizcaya
Cebu	1.53.	.4.73	Bulacan
Leyte	1.53.	.4.72	Rizal
Samar	1.21.	.4.63	Cavite
Zamboanga	1.05.	.4.60	Laguna

The application of the theory of correlation involves numerous mathematical computations. The simplest method enables one to determine roughly the degree of correlation between two veriables by a simple diagram, such as is shown in Chart I, without entailing mathematical calculations. Such a method, however, does not enable one to measure the degree of association or correlation. From mere inspection of Chart I, one may deduce that the higher rates correspond to, or to use the statistical term, are "correlated" with, the lower figures in the dwellings.

The underlying principle of the method of correlation is the measurement of the association between two values in terms of the coefficient of correlation. This coefficient is expressed as follows:

$$r_{12} = \frac{S\ (x_1\ x_2)}{N\ P_1\ P_2}$$

where r_{12} = the correlation coefficient.
X_1 and X_2 = the variables correlated.
x_1 and x_2 = the deviations from the means of X_1 and X_2 respectively.
S = Summation
P_1 and P_2 = the standard deviations of X_1 and X_2.
N = number of observations (variates).

The coefficient may very from zero to one, in the direction of either positive or negative, depending upon the nature of the correlation. The numerical value of

Table I.- Correlation Between Death-rates from Pulmonary Tuberculosis and Average Number of Persons to a Dwelling in Certain Provinces of the Philippine Islands.

No	PROVINCE	Death rate from Pulm. Tuber.	Ave. No. Per. to a Dwelling	Deviation of X_1 from Mean	Deviation of X_2 from Mean			PRODUCTS x_1x_2	
		X_1	X_2	x_1	x_2	x_1^2	x_2^2	Negative	Positive
1	Abra	3.52	5.27	-.83	-.28	.6889	.0784		.2324
2	Albay	3.40	6.03	-.95	+.48	.9025	.2304	.4560	
3	Am.Camarines	5.61	5.78	+1.26	+.23	1.5876	.0529		.2898
4	Antique	6.29	6.01	+1.94	+.46	3.7636	.2116		.8924
5	Bataan	8.99	5.36	+4.64	-.19	21.5296	.0361	.8816	
6	Batangas	6.78	5.20	+2.43	-.35	5.9049	.1225	.8505	
7	Bohol	2.01	5.89	-2.34	+.34	5.4756	.1156	.7956	
8	Bulacan	7.17	4.73	+2.82	-.82	7.9524	.6724	2.3124	
9	Cagayan	3.90	5.23	-.45	-.32	.2025	.1024		.1440
10	Capiz	4.22	5.69	-.13	+.14	.0169	.0196	.0182	
11	Cavite	5.52	4.63	+1.17	-.92	1.3689	.8464	1.0764	
12	Cebu	1.53	5.76	-2.82	+.21	7.9524	.0441	.5922	
13	Ilocos Norte	2.76	4.94	-1.59	-.61	2.5281	.3721		.9699
14	Ilocos Sur	3.00	5.09	-1.35	-.46	1.8225	.2116		.6210
15	Iloilo	5.02	6.14	+.67	+.59	.4489	.3481		.3953
16	Isabela	3.74	4.98	-.61	-.57	.3721	.3249		.3477
17	Laguna	13.37	4.60	+9.02	-.95	81.3604	.9025	8.5690	
18	La Union	2.61	5.78	-1.74	+.23	3.0276	.0529	.4002	
19	Leyte	1.53	5.59	-2.82	+.04	7.9524	.0016	.1128	
20	Marinduque	4.88	6.04	+.53	+.49	.2809	.2401		.2597
21	Masbate	1.65	6.43	-2.70	+.88	7.2900	.7744	2.3760	
22	Mindoro	4.30	6.17	-.05	+.62	.0025	.3844	.0310	
23	Misamis	2.66	6.32	-1.69	+.77	2.8561	.5929	1.3013	
24	Nueva Ecija	5.41	4.99	+1.06	-.56	1.1236	.3136	.5936	
25	N.Vizcaya	3.74	4.90	-.61	-.65	.3721	.4225		.3965
26	Occ. Negros	4.58	6.32	+.23	+.77	.0529	.5929		.1771
27	Orien.Negros	2.66	5.99	-1.69	+.44	2.8561	.1936	.7436	
28	Palawan	1.63	5.85	-2.72	+.30	7.3984	.0900	.8160	
29	Pampanga	6.07	5.43	+1.72	-.12	2.9584	.0144	.2064	
30	Pangasinan	4.83	5.21	+.48	-.34	.2304	.1156	.1632	
31	Rizal	7.86	4.72	+3.51	-.83	12.3201	.6889	2.9133	
32	Romblon	3.37	6.06	-.98	+.51	.9604	.2601	.4998	
33	Samar	1.21	5.72	-3.14	+.17	9.8596	.0289	.5338	
34	Sorsogon	3.25	5.68	-1.10	+.13	1.2100	.0169	.1430	
35	Surigao	2.18	6.36	-2.17	+.81	4.7089	.6561	1.7577	
36	Tarlac	4.89	4.98	+.54	-.57	.2916	.3249	.3078	
37	Tayabas	7.15	5.31	+2.80	-.24	7.8400	.0576	.6720	
38	Zambales	5.30	5.15	+.95	-.40	.9025	.1600	.3800	
39	Zamboanga	1.05	6.08	-3.30	+.53	10.8900	.2809	1.7490	
Total		169.64	216.41			229.2683	10.9548	31.2524	4.7258
		Mean 4.35	Mean 5.55			$P_1 =$ 2.4246	$P_2 =$ .5300	S $x_1x_2 =$ 26.5266	

this coefficient expresses the degree of association, approaching perfection of correlation as the value approaches unity. In other words, if the value is either -1 or +1, the correlation is perfect, i.e., for every change in one variable, there is a definite and constant proportional change in the other.

Table I illustrates the arithmetical work involved in the computation of the coefficient of correlation. From this table P_1 and P_2 are derived according to the following formula:

$$P = \frac{S\ x^2}{\sqrt{N}}$$

where $N = 39$
S = Summation of x^2

The values of P_1 and P_2 are 2.4246 and .5300, respectively. From the formula given above for the coefficient, the value of r_{12} is found to be -.6613. Before conclusions can be drawn from this figure, it is necessary to know something about the probable error. The probable error is a conventional measure of reliability of results. "It is a constant so chosen that when its value is added to and subtracted from the result obtained or the numerical conclusion reached, it is exactly an even chance that the true result or conclusion lies either inside or outside the limits set by the probable error in the plus and

minus direction. For example, if it is stated that the mean age of death of persons dying in Baltimore is 39.83±2.60 years, it means that the mathematical probability that the true average age falls between 37.23 years (39.83-2.60) and 42.43 years (39.83+2.60) is exactly equal to the mathematical probability that the true age falls outside those limits." (1). The significance of our results, therefore, can be judged only after considering their relation to their probable errors. With correlation coefficients, Bowley and Hooker (9) consider that when it is six times or greater than the probable error it is practically certain that the two factors in question are associated, i.e., the coefficient is significant. Professor Raymond Pearl (1) considers a coefficient not significantly different from zero when it is not more than four times its probable error. This basis of interpreting the probable error and coefficient will be considered as the criterion of significant results in this paper.

ANALYSIS OF RESULTS

The death-rates from the diseases under consideration in the thirty-nine provinces are each correlated with the values of the personal property and real estate per capita, with taxes per capita, with the average number of

persons to a dwelling. Table II shows the means and the standard deviations of the factors entering into the correlation. Table III shows the correlation coefficients. Casual examination of this table reveals a most interesting and rather surprising result, inasmuch as the coefficients are for the most part contrary to what was expected. For a closer scrutiny and analysis, each of the diseases is considered separately.

Table II.- Means and Standard Deviations of Death-Rates From Certain Diseases and Certain Economic and Housing Factors.

VARIABLES	STANDARD DEVIATION	MEAN
All Causes	24.38 ±1.86	61.57 ±2.63
Malaria	9.87 ±0.75	17.19 ±1.07
Smallpox	3.23 ±0.25	1.99 ±0.35
Asiatic Cholera	13.40 ±1.02	18.80 ±1.45
Dysentery	1.98 ±0.15	2.55 ±0.21
Leprosy	.017±0.001	.017±0.002
Beri-beri	.55 ±0.04	.67 ±0.06
Tuberculosis	2.42 ±0.19	4.35 ±0.26
Real Estate	57.32 ±4.38	78.24 ±6.19
Taxes	.68 ±0.05	.96 ±0.07
Family	.52 ±0.04	4.70 ±0.06
Dwelling	.53 ±0.04	5.55 ±0.06

Table III- Correlation Between Death-rates From Certain Diseases and Certain Economic and Housing Factors.

DISEASES	CORRELATED WITH			
	Personal Prop.and R.Estate	Taxes	Persons in Family	Persons in Dwelling
ALL CAUSES	+.18 ±.10	+.36 ±.09	-.52 ±.08	-.32 ±.10
Malaria	+.12 ±.11	+.26 ±.10	-.22 ±.10	-.05 ±.11
Smallpox	-.08 ±.11	-.10 ±.11	+.17 ±.10	-.09 ±.11
Asiatic Cholera	+.01 ±.11	+.42 ±.09	-.49 ±.08	-.10 ±.11
Dysentery	+.11 ±.11	-.12 ±.11	-.39 ±.09	-.31 ±.10
Leprosy	-.19 ±.10	-.04 ±.11	-.09 ±.11	-.23 ±.10
Beri-beri	+.13 ±.11	-.11 ±.11	+.06 ±.11	+.03 ±.11
Tuberculosis	+.37 ±.09	+.06 ±.11	-.42 ±.09	-.53 ±.08

All Causes.-The coefficient with personal property and real estate is +.18, which considered with its probable error,±.10, is not significantly different from zero. The coefficient with taxes is just four times its probable error and, therefore, no significance can be attached to it. That, with the average number of persons to the family is high, revealing a negative association of the rates with the number of persons in the family. In other words, high death-rates occur in provinces where families are small.

Asiatic Cholera.- The coefficients with taxes, and number of persons to the family are both significant. It is judged from this that the death-rates from cholera are higher among the people in provinces where higher taxes per capita are paid. It furthermore means that the rates are inversely proportional to the number of persons in the family. There is, however, an apparent anomaly in the death-rates having a negative correlation with the number of persons in the family and no correlation with the number of persons in the dwelling, considering the fact, alluded to above, that families and dwellings are factors of practically the same nature.

Dysentery.- Economic factors show no association with death-rates from dysentery. Persons in the family, however, appear to be slightly negatively associated with the rates.

Pulmonary Tuberculosis.- In this disease, like the case in "All Causes", asiatic cholera, and dysentery, the association with the number of persons in the family is apparent. Unlike any of the others, however, the correlation with the number of persons in the dwelling is high. In fact, the coefficient for this is the highest obtained in the whole series. Taxes, as a factor, shows no association. The correlation coefficient with personal prop-

erty and real estate is shown in Table II as being slightly more than four times the probable error. The actual figures, carried to four decimal places, however, are +.3708 with a probable error of ±.0932, the former being slightly less than four times the latter. The coefficient, therefore, does not indicate any association of death-rates with real estate.

Malaria, Smallpox, Leprosy and Beri-beri.- None of the coefficients for these diseases has any significance.

DISCUSSION

The results may or may not mean much. If the computations of the coefficients be correct and not subject to spurious correlation, then the figures, contradictory as they are, should arouse the interest of the student of statistics and epidemology. Precluding the possibility of the influence of spurious correlation on these figures, however, a few fundamental reasons which are thought to have a bearing on the results may be offered.

In the consideration of the various death-rates, it is deemed necessary to note just what may be the effects of civilization upon a people like the Fili-

pinos, presenting, as they do, a population of heterogeneous character. Down through history, the acquisition of civilization by the so-called primitive peoples has been followed by a general weakening of their natural powers. Attention is drawn to its effects upon the American Indians, for instance. Since they, as nations, possessed no acquired specific immunity against the diseases that follow closely in the path of civilization, they easily succumbed to them. Another effect, closely allied, is the influence upon the size of the families. Is it not the general trend of sociological developments that the less enlightened peoples have larger families than those endowed with the benefits of culture and civilization?

Furthermore, it is generally conceded that the people of the better and wealthy class, who naturally represent the portion of the population possessing higher culture and civilization, have lower resistance to disease than the lower and poorer class, who are hardy, and live close to nature. Their families are large; many families live under the same roof. However, due to the climate, they do not cling to the dwelling as do the better and wealthier class. Thus a large number of persons in the family or dwelling

among these people is only an apparent crowding and not real.

All the diseases but Asiatic Cholera exhibit no association with either real estate or taxes per capita. In cholera, there seems to be a definite correlation with taxes, indicating that in the Philippine Islands, the death-rates from this disease are found highest in the provinces where the population pays relatively higher taxes. If the amount of taxes paid per capita in a province can be considered as a means of estimating the wealth of the population, the conclusion that can be drawn from this coefficient is that the wealthier the people, the more liable they are to infection from cholera. This seemingly puzzling phenomenon is precisely what would be expected if we were to consider the effects of civilization as referred to above. Examination of the data reveals the fact that where death-rates are highest, the provinces concerned possess a population of a higher culture than those of the provinces which present lower death-rates.

The results with the housing factors are likewise puzzling. If the coefficients were to be taken as a true measure of correlation between the death-rates and the housing factors, at least as far as "All Causes", Asiatic

Cholera, Dysentery and Pulmonary Tuberculosis are concerned, higher rates are found in provinces where the families are smaller, and in the case of tuberculosis, also, where the average number of persons to a dwelling is least. Again, the effects of civilization are offered to justify this phenomenon. It has been alluded to above that civilization tends to make the families smaller; likewise it is pointed out that morbidity increases with the advance of civilization. It is, then, the combined effects of this factor that influence the correlation of death-rates with the housing factors. It is to be remembered that the poorer and the less enlightened class are those who possess larger families and dwellings with larger number of occupants. It must be remembered, too, that only numerical crowding exists, and that the dwellings are of the type that are well ventilated. Then there is the possibility that the more crowded the dwellings are, the greater will be the tendency for the people to live out of doors. They are, consequently, the hardy type, the outdoor-loving people, and therefore the class who possess higher resistance to disease. This assumption is apparently borne out by the fact that the provinces wherein the death-rates are lower and the families larger, the population belongs to the above class.

SUMMARY

The coefficients obtained show that the death-rates from Asiatic Cholera are associated with the taxes paid per capita in the provinces, indicating that in the provinces where higher taxes are paid, the death-rates from this disease are highest. In the case of All Causes, Asiatic Cholera, Dysentery and Pulmonary Tuberculosis, the higher death-rates from these diseases are found in the provinces where the average number of persons in the family is lower. In Pulmonary Tuberculosis alone exists an association with the number of persons to the dwelling. The coefficient being negative, the conclusion which can be drawn therefrom is that Pulmonary Tuberculosis brings about a higher death-rate in less crowded dwellings.

ACKNOWLEDGMENT

Appreciation is hereby extended to Professors Raymond Pearl and L. J. Reed for valuable assistance, instruction and personal interest shown throughout this work.

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APPENDIX

Table No. 1.- Population of Certain Provinces in the Philippine Islands, Showing the Reciprocal for Each Province. Figures represent only the Civilized Population. Data from the Philippine Census, 1903.

Serial No.	PROVINCE	Population	Reciprocal .0000
1	Abra	37, 823	264 389
2	Albay	239, 434	041 765
3	Am. Camarines	233, 472	042 832
4	Antique	131, 245	076 193
5	Bataan	45, 166	221 405
6	Batangas	257, 715	038 803
7	Bohol	269, 223	037 144
8	Bulacan	223, 327	044 777
9	Cagayan	142, 825	070 016
10	Capiz	225, 092	044 426
11	Cavite	134, 779	074 196
12	Cebu	653, 727	015 297
13	Ilocos Norte	176, 785	056 566
14	Ilocos Sur	173, 800	057 537
15	Iloilo	403, 932	024 757
16	Isabela	68, 793	145 364
17	Laguna	148, 606	067 292
18	La Union	127, 789	078 254
19	Leyte	388, 922	025 712
20	Marinduque	51, 674	193 521
21	Masbate	43, 675	228 964
22	Mindoro	32, 318	309 425
23	Misamis	135, 473	073 815
24	Nueva Ecija	132, 999	075 189
25	N. Vizcaya	16, 026	623 986
26	Occ. Negros	303, 660	032 932
27	Orient. Negros	184, 889	054 087
28	Palawan	28, 852	346 596
29	Pampanga	222, 656	044 912
30	Pangasinan	394, 516	025 348
31	Rizal	148, 502	067 339
32	Romblon	52, 848	189 222
33	Samar	265, 549	037 658
34	Sorsogon	120, 454	083 019
35	Surigao	99, 298	100 707
36	Tarlac	133, 513	074 899
37	Tayabas	150, 262	066 550
38	Zambales	101, 381	098 638
39	Zamboanga	39, 177	255 252
40	All Provinces	6, 740, 177	001 484

Table No. 2. Deaths from Certain Principal Causes in Certain Provinces, Philippine Islands. Data for 1902, Philippine Census 1903.

No.	Province	CAUSE OF DEATH							
		All Causes	Malaria	Small Pox	A.Cholera	Dysentery	Leprosy	Beriberi	Tuberculosis
1	Abra	1296	398	1	464	41	0	6	133
2	Albay	11564	3103	1239	480	279	2	187	815
3	Am.Camarines	10872	2634	1189	1144	327	1	494	1309
4	Antique	7411	3181	173	827	372	1	19	826
5	Bataan	4479	613	3	2252	218	0	29	406
6	Batangas	34257	13216	44	10383	1784	2	282	1747
7	Bohol	10851	2748	425	4883	279	3	30	542
8	Bulacan	13015	2041	248	2494	413	1	198	1602
9	Cagayan	9783	2724	2418	1375	249	8	57	557
10	Capiz	15564	3254	694	5903	1339	4	263	949
11	Cavite	8983	2073	289	1893	374	2	87	744
12	Cebu	20920	7020	1269	5800	216	20	673	1001
13	Ilocos Norte	10657	2236	233	3907	1057	11	28	488
14	Ilocos Sur	12694	1214	4	8187	293	7	13	521
15	Iloilo	51153	16572	33	21772	645	5	168	2028
16	Isabela	4584	1357	569	861	267	1	23	257
17	Laguna	15918	4877	2	4763	806	3	241	1987
18	La Union	8821	1008	449	4647	696	4	30	333
19	Leyte	17016	5011	2465	3618	269	8	381	594
20	Marinduque	3222	1466	0	265	156	0	43	252
21	Masbate	1881	811	18	664	9	0	7	72
22	Mindoro	2466	621	113	854	226	0	66	139
23	Misamis	9038	4961	0	2386	155	3	190	361
24	Nueva Ecija	8487	2553	121	1642	332	5	75	720
25	N.Vizcaya	1228	511	1	433	14	0	1	60
26	Occ.Negros	24461	3220	17	12710	837	2	72	1390
27	Orien.Negros	5972	2135	77	1875	110	8	92	492
28	Palawan	664	160	0	185	26	0	19	47
29	Pampanga	14383	3247	127	2672	502	1	60	1352
30	Pangasinan	24701	6531	104	9536	1028	22	86	1905
31	Rizal	11883	1648	148	3370	453	3	187	1167
32	Romblon	1422	531	0	164	30	2	33	178
33	Samar	13614	3913	1789	4226	253	9	235	320
34	Sorsogon	4380	998	82	310	157	1	92	391
35	Surigao	3304	1200	35	1142	25	1	62	216
36	Tarlac	7088	2453	55	1464	143	1	34	653
37	Tayabas	9418	3501	1	1569	680	1	254	1075
38	Zambales	6772	1398	396	2180	584	2	16	537
39	Zamboanga	1559	366	0	752	64	0	1	41
40	All Provinces	425781	117504	14831	134052	15708	144	4834	28207

Table No. 3. Death Rate per 1000 Population from Certain Principal Causes in Certain Provinces of the Philippine Islands. Computed from Tables 1 and 2.

No	PROVINCE	CAUSE OF DEATH							
		All Causes	Malaria	Small-pox	A.Cholera	Dysentery	Leprosy	Beriberi	Tuberculosis
1	Abra	34.26	10.52	.03	12.27	1.08	.000	.16	3.52
2	Albay	48.30	12.96	5.17	2.00	1.17	.008	.78	3.40
3	Am.Camarines	46.57	11.28	5.09	4.90	1.40	.004	2.12	5.61
4	Antique	56.47	24.24	1.32	6.30	2.83	.008	.14	6.29
5	Bataan	99.17	13.57	.07	49.86	4.83	.000	.64	8.99
6	Batangas	132.93	51.28	.17	40.29	6.92	.008	1.09	6.78
7	Bohol	40.30	10.21	1.58	18.14	1.04	.011	.11	2.01
8	Bulacan	58.28	9.14	1.11	11.17	1.85	.004	.89	7.17
9	Cagayan	68.50	19.07	16.93	9.63	1.74	.056	.40	3.90
10	Capiz	69.14	14.46	3.08	26.22	5.95	.018	1.17	4.22
11	Cavite	66.65	15.38	2.14	14.05	2.77	.015	.65	5.52
12	Cebu	32.00	10.74	1.94	8.87	.33	.031	1.03	1.53
13	Ilocos Norte	60.28	12.65	1.32	22.10	5.98	.062	.16	2.76
14	Ilocos Sur	73.04	6.98	.02	47.11	1.69	.040	.07	3.00
15	Iloilo	126.64	41.03	.08	53.90	1.60	.012	.42	5.02
16	Isabela	66.63	19.73	8.27	12.52	3.88	.015	.33	3.74
17	Laguna	107.12	32.82	.01	32.05	5.42	.020	1.62	13.37
18	La Union	69.03	7.89	3.51	36.36	5.45	.031	.23	2.61
19	Leyte	43.75	12.88	6.34	9.30	.69	.021	.98	1.53
20	Marinduque	62.35	28.37	.00	5.13	3.02	.000	.83	4.88
21	Masbate	43.07	18.57	.41	15.20	.21	.000	.16	1.65
22	Mindoro	76.30	19.22	3.50	26.42	6.99	.000	2.04	4.30
23	Misamis	66.71	36.62	.00	17.61	1.14	.022	1.40	2.66
24	Nueva Ecija	63.81	19.20	.91	12.35	2.50	.038	.56	5.41
25	N. Vizcaya	76.63	31.89	.06	27.02	.87	.000	.06	3.74
26	Occ. Negros	80.55	10.60	.06	41.86	2.76	.007	.24	4.58
27	Orien.Negros	32.30	11.55	.42	10.14	.59	.043	.50	2.66
28	Palawan	23.01	5.55	.00	6.41	.90	.000	.66	1.63
29	Pampanga	64.60	14.58	.57	12.00	2.25	.004	.27	6.07
30	Pangasinan	62.61	16.55	.26	24.17	2.61	.056	.22	4.83
31	Rizal	80.02	11.10	1.00	22.69	3.05	.020	1.26	7.86
32	Romblon	26.91	10.05	.00	3.10	.57	.038	.62	3.37
33	Samar	51.27	14.74	6.74	15.91	.95	.034	.88	1.21
34	Sorsogon	36.36	8.29	.68	2.57	1.30	.008	.76	3.25
35	Surigao	33.27	12.08	.35	11.50	.25	.010	.62	2.18
36	Tarlac	53.09	18.37	.41	10.97	1.07	.007	.25	4.89
37	Tayabas	62.68	23.30	.01	10.44	4.53	.007	1.69	7.15
38	Zambales	66.80	13.79	3.91	21.50	5.76	.020	.16	5.30
39	Zamboanga	39.79	9.34	.00	19.19	1.63	.000	.03	1.05
40	All Prov.	63.19	17.44	2.20	19.89	2.33	.021	.72	4.19

Table No. 4.- Taxes, Personal Property and Real Estate In Certain Provinces in the Philippine Islands. The Taxes, Personal Property and Real Estate are Given in Pesos*. Data for Year 1903, Philippine Census 1903.

* One Peso is equivalent to fifty cents, U. S. Currency.

No.	PROVINCE	Population	Personal Property and Real Estate	Total Taxes	Per Capita	
					P.P. and R.Estate	Taxes
1	Abra	37,823	2,519,141	24,437	66.60	.65
2	Albay	239,434	20,093,494	209,519	83.92	.88
3	Am.Camarines	233,472	19,145,796	185,404	82.01	.79
4	Antique	131,245	4,729,448	73,203	36.04	.56
5	Bataan	45,166	4,192,727	64,882	92.83	1.44
6	Batangas	257,715	16,746,641	94,016	64.98	.36
7	Bohol	269,223	10,339,489	108,313	38.40	.40
8	Bulacan	223,327	23,092,072	133,512	103.40	.60
9	Cagayan	142,825	8,463,750	137,155	59.26	.96
10	Capiz	225,092	14,749,631	116,962	65.53	.52
11	Cavite	134,779	9,516,387	109,927	70.61	.82
12	Cebu	653,727	28,006,833	1,062,346	42.84	1.63
13	Ilocos Norte	176,785	9,838,973	127,156	55.66	.72
14	Ilocos Sur	173,800	9,673,426	243,799	55.66	1.40
15	Iloilo	403,932	36,165,306	1,889,352	89.53	4.68
16	Isabela	68,793	3,897,809	95,662	56.66	1.39
17	Laguna	148,606	21,147,665	162,024	142.31	1.09
18	La Union	127,789	7,148,716	136,276	55.94	1.07
19	Leyte	388,922	36,751,003	248,750	94.49	.64
20	Marinduque	51,674	5,384,084	37,411	104.19	.72
21	Masbate	43,675	1,498,159	63,546	34.30	1.45
22	Mindoro	32,318	3,874,877	13,914	119.90	.43
23	Misamis	135,473	5,392,478	107,261	39.80	.79
24	Nueva Ecija	132,999	10,061,985	79,612	75.66	.60
25	N. Vizcaya	16,026	1,013,865	12,005	63.26	.75
26	Occ. Negros	303,660	24,866,738	269,961	81.89	.89
27	Orien.Negros	184,889	9,507,844	132,740	51.43	.72
28	Palawan	28,852	426,054	18,619	14.77	.65
29	Pampanga	222,656	20,684,237	178,213	92.90	.80
30	Pangasinan	394,516	28,802,738	300,380	73.01	.76
31	Rizal	148,502	14,528,570	143,866	97.83	.97
32	Romblon	52,848	1,673,029	52,187	31.66	.99
33	Samar	265,549	13,439,701	87,057	50.61	.33
34	Sorsogon	120,454	10,735,815	154,075	89.13	1.28
35	Surigao	99,298	3,499,377	66,263	35.24	.67
36	Tarlac	133,513	51,764,605	105,650	387.71	.79
37	Tayabas	150,262	18,827,450	203,001	125.30	1.35
38	Zambales	101,381	7,912,530	79,228	78.05	.78
39	Zamboanga	39,177	1,883,335	47,423	48.07	1.21
40	All Provinces	6,740,177	521,995,778	7,375,107	77.46	1.09

Table No. 5- Civilized Population, Total Dwellings and Families, and Average Number of Persons To a Dwelling and a Family in Certain Provinces of the Philippine Islands. Data For Year 1903, Philippine Census, 1903.

Serial No.	PROVINCE	POPULATION	Total Dwellings	Total Families	Average Per. t	
					Dwelling	Family.
1	Abra	37,823	7,177	9,072	5.27	4.17
2	Albay	239,434	39,720	50,563	6.03	4.74
3	Am. Camarines	233,472	40,410	48,826	5.78	4.78
4	Antique	131,245	21,842	24,701	6.01	5.31
5	Bataan	45,166	8,432	9,928	5.36	4.55
6	Batangas	257,715	49,538	63,831	5.20	4.04
7	Bohol	269,223	45,687	46,901	5.89	5.74
8	Bulacan	223,327	47,212	49,266	4.73	4.53
9	Cagayan	142,825	27,297	28,328	5.23	5.04
10	Capiz	225,092	39,544	48,769	5.69	4.62
11	Cavite	134,779	29,124	33,853	4.63	3.98
12	Cebu	653,727	113,481	116,069	5.76	5.63
13	Ilocos Norte	176,785	35,811	43,773	4.94	4.04
14	Ilocos Sur	173,800	34,124	44,180	5.09	3.93
15	Iloilo	403,932	65,795	94,454	6.14	4.28
16	Isabela	68,793	13,814	14,627	4.98	4.70
17	Laguna	148,606	32,308	37,217	4.60	3.99
18	La Union	127,789	22,117	28,030	5.78	4.56
19	Leyte	388,922	69,526	71,659	5.59	5.43
20	Marinduque	51,674	8,550	9,445	6.04	5.47
21	Masbate	43,675	6,790	8,493	6.43	5.14
22	Mindoro	32,318	5,236	7,232	6.17	4.47
23	Misamis	135,473	21,443	25,611	6.32	5.29
24	Nueva Ecija	132,999	26,630	30,664	4.99	4.34
25	N. Vizcaya	16,026	3,269	4,470	4.90	3.59
26	Occ. Negros	303,660	48,030	68,327	6.32	4.44
27	Orien. Negros	184,889	30,889	36,970	5.99	5.00
28	Palawan	28,852	4,928	6,420	5.85	4.49
29	Pampanga	222,656	40,994	47,257	5.43	4.71
30	Pangasinan	394,516	75,652	92,080	5.21	4.28
31	Rizal	148,502	31,466	31,957	4.72	4.65
32	Romblon	52,848	8,726	11,046	6.06	4.78
33	Samar	265,549	46,428	56,121	5.72	4.73
34	Sorsogon	120,454	21,205	23,582	5.68	5.11
35	Surigao	99,298	15,620	17,265	6.36	5.75
36	Tarlac	133,513	26,820	31,029	4.98	4.30
37	Tayabas	150,262	28,302	32,231	5.31	4.66
38	Zambales	101,381	19,675	21,810	5.15	4.65
39	Zamboanga	39,177	6,445	7,408	6.08	5.29
40	All Provinces	6,740,177	1,220,157	1,433,465	5.52	4.70

Chart No. 1.- Correlation Between Death Rate per 1000 population from All Causes (Left Column) and Value of Personal Property and Real Estate per Capita (in Pesos) (Right Column), in Certain Provinces of the Philippine Islands. Data from tables 3 and

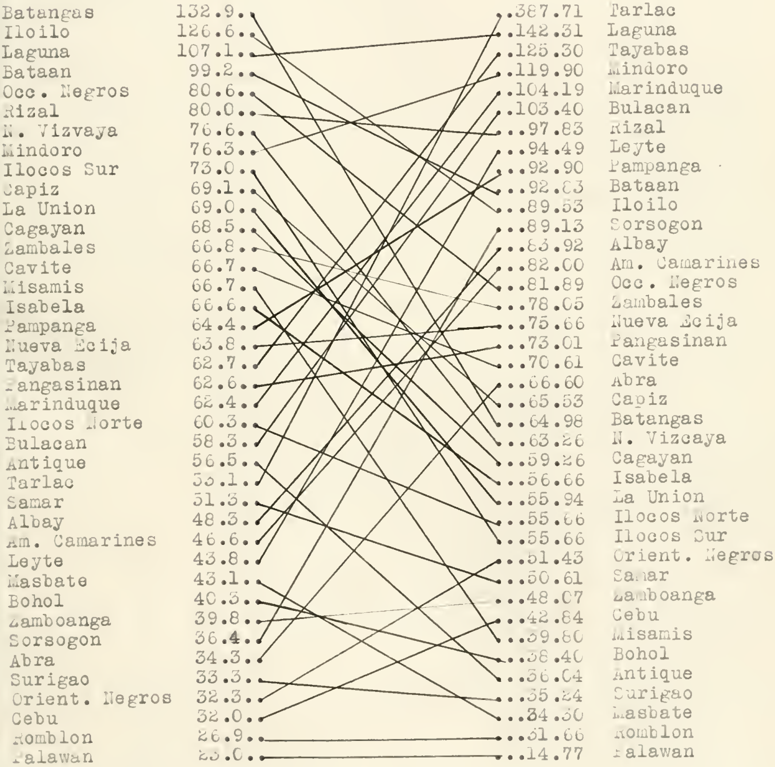


Chart No. 2.- Correlation Between Death Rate per 1000 Population from All Causes (Left Column) and Taxes paid per Capita (Right column), in Certain Provinces of the Philippine Islands. Data from tables 3 and

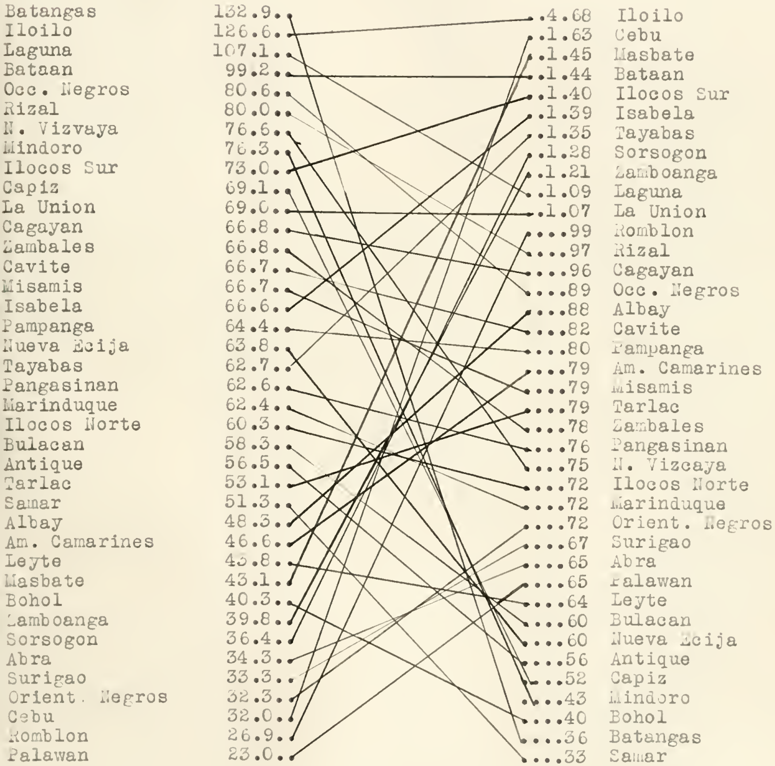
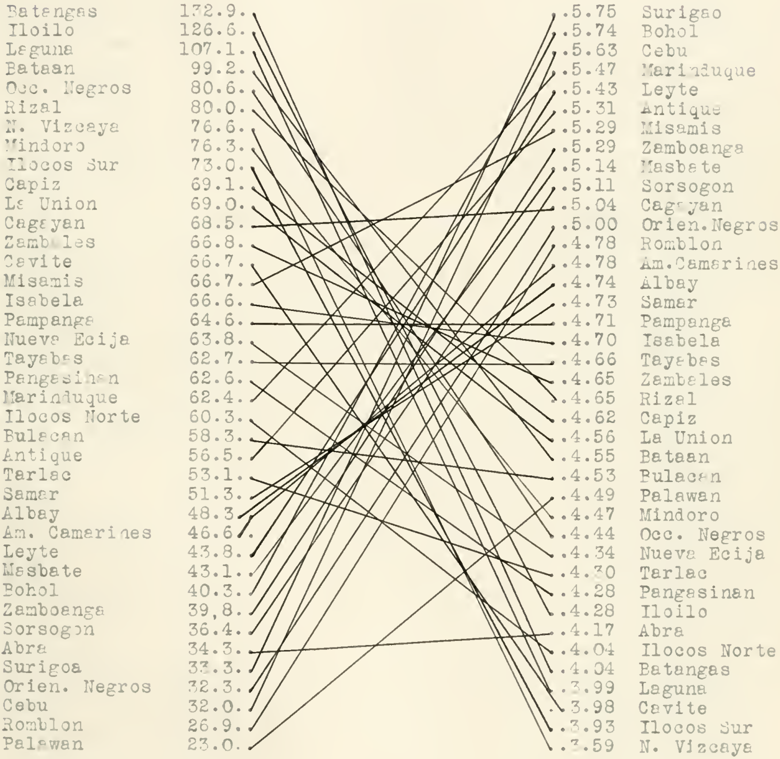


Chart No. 3.- Correlation Between Death Rate Per 1000 Population From All Causes (Left Column) and Average Number of Persons to A Family (Right Column), in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.



Batangas	132.9
Iloilo	126.6
Laguna	107.1
Bataan	99.2
Occ. Negros	80.6
Rizal	80.0
N. Vizcaya	76.6
Mindoro	76.3
Ilocos Sur	73.0
Capiz	69.1
La Union	69.0
Cagayan	68.5
Zambales	66.8
Cavite	66.7
Misamis	66.7
Isabela	66.6
Pampanga	64.6
Nueva Ecija	63.8
Tayabas	62.7
Pangasinan	62.6
Marinduque	62.4
Ilocos Norte	60.3
Bulacan	58.3
Antique	56.5
Tarlac	53.1
Samar	51.3
Albay	48.3
Am. Camarines	46.6
Leyte	43.8
Masbate	43.1
Bohol	40.3
Zamboanga	39,8
Sorsogon	36.4
Abra	34.3
Surigoa	33.3
Orien. Negros	32.3
Cebu	32.0
Romblon	26.9
Palawan	23.0

5.75	Surigao
5.74	Bohol
5.63	Cebu
5.47	Marinduque
5.43	Leyte
5.31	Antique
5.29	Misamis
5.29	Zamboanga
5.14	Masbate
5.11	Sorsogon
5.04	Cagayan
5.00	Orien. Negros
4.78	Romblon
4.78	Am. Camarines
4.74	Albay
4.73	Samar
4.71	Pampanga
4.70	Isabela
4.66	Tayabas
4.65	Zambales
4.65	Rizal
4.62	Capiz
4.56	La Union
4.55	Bataan
4.53	Bulacan
4.49	Palawan
4.47	Mindoro
4.44	Occ. Negros
4.34	Nueva Ecija
4.30	Tarlac
4.28	Pangasinan
4.28	Iloilo
4.17	Abra
4.04	Ilocos Norte
4.04	Batangas
3.99	Laguna
3.98	Cavite
3.93	Ilocos Sur
3.59	N. Vizcaya

Chart No. 4.- Correlation Between Death Rate Per 1000 Population From All Causes (Left Column) and Average Number of Persons to a Dwelling (Right Column), in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

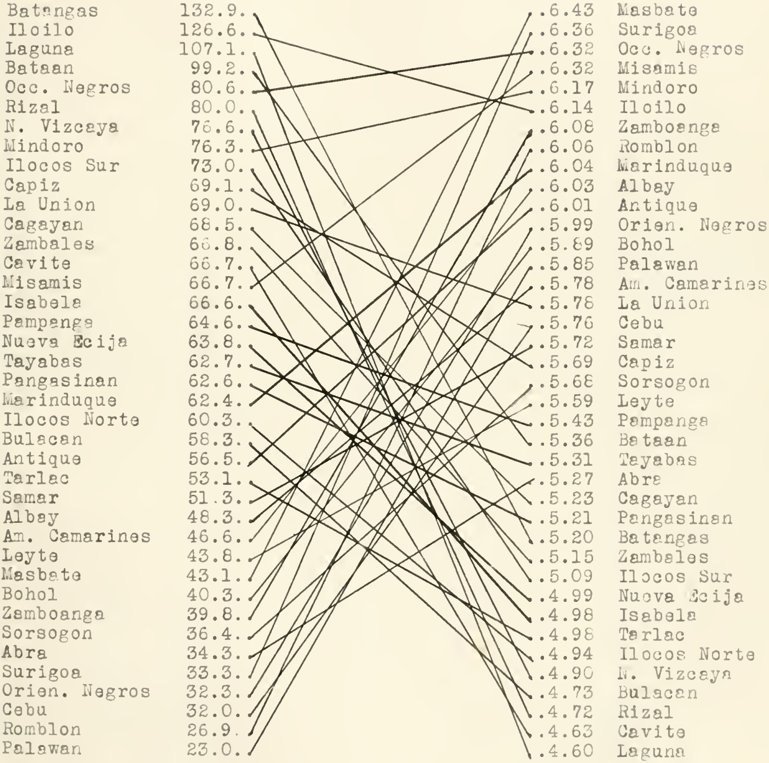


Chart No. 5.- Correlation Between Death Rate Per 1000 Population From Malaria (Left Column) and Value of Personal Property and Real Estate per Capita (In Pesos) (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 4.

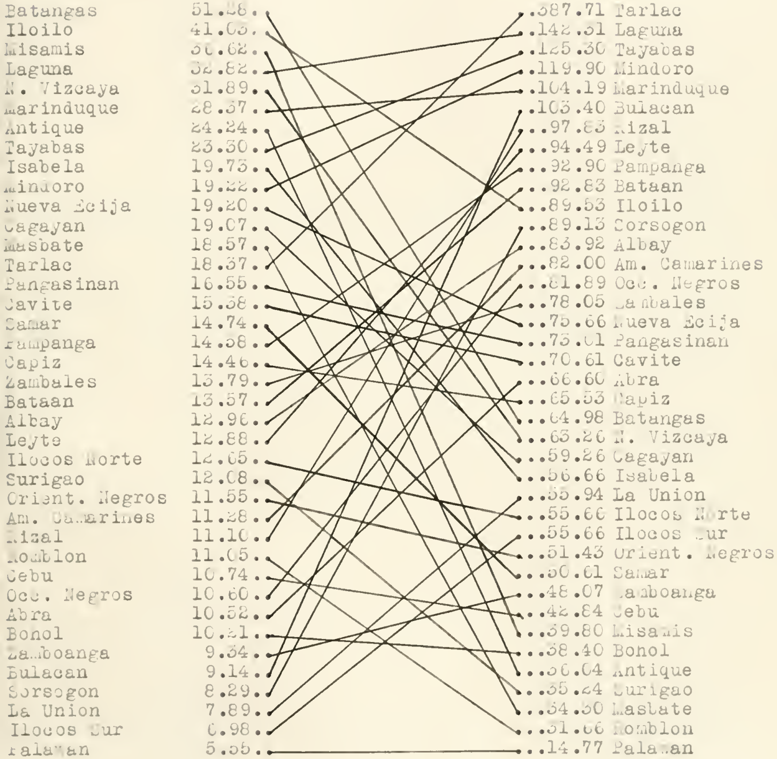


Chart No. 6.—Correlation Between Death Rate Per 1000 Population From Malaria (Left Column) and Taxes Paid Per Capita (In Pesos) (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 4.

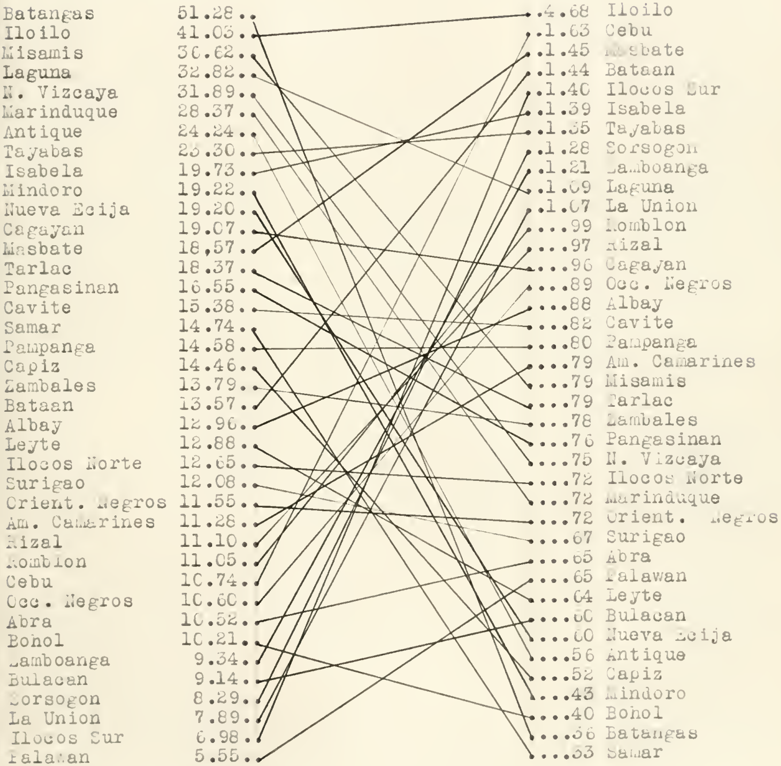


Chart No.7.- Correlation Between Death Rate Per 1000 Population From Malaria(Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3.and 5.

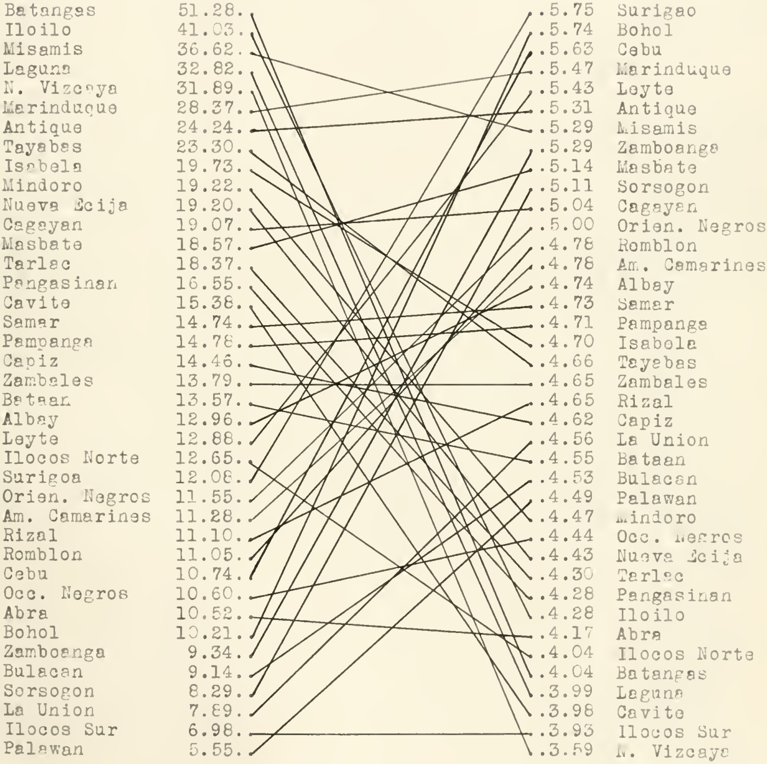


Chart No.8.- Correlation Between Death Rate Per 1000 Population From Malaria (left Column) and Average Number of Persons to a Dwelling (Right Column), in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

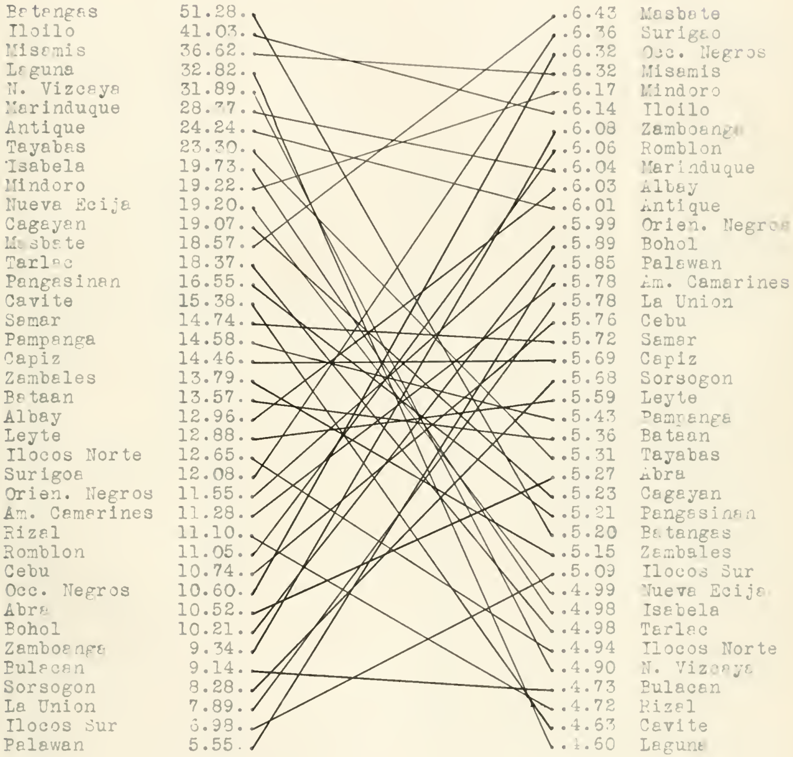


Chart No. 9.- Correlation Between Death Rate per 1000 Population from Smallpox (Left Column) and Value of Personal Property and Real Estate per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

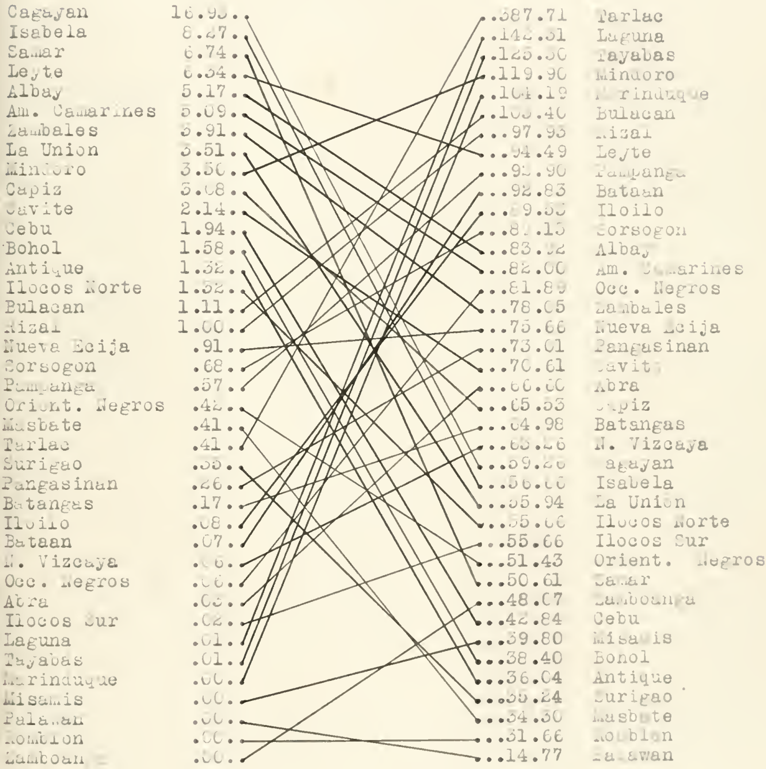
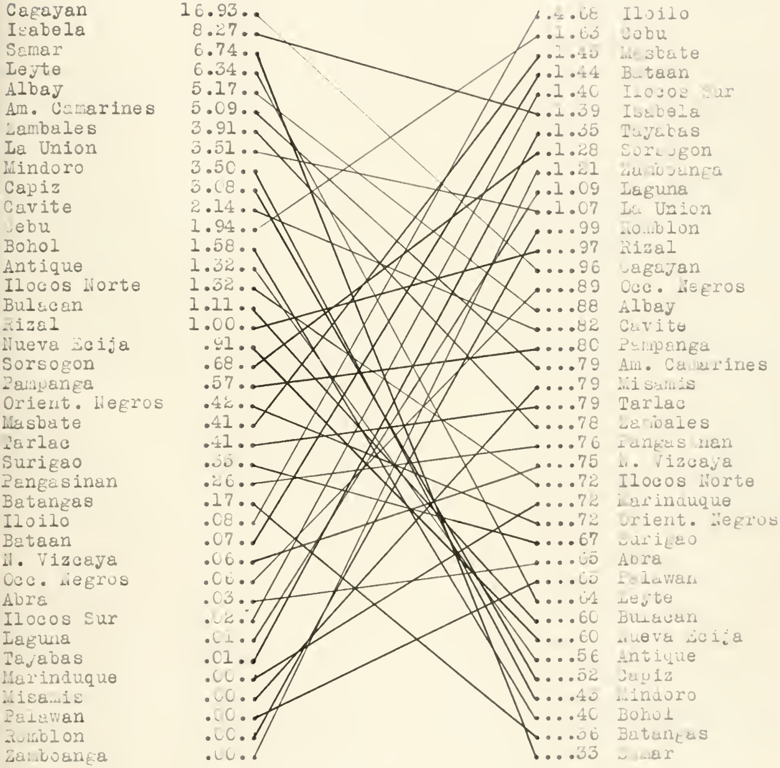


Chart No. 10.-Correlation Between Death Rate per 1000 Population from Smallpox (Left Column) and Taxes Paid per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables



Cagayan	16.93
Isabela	8.27
Samar	6.74
Leyte	6.34
Albay	5.17
Am. Camarines	5.09
Zambales	3.91
La Union	3.51
Mindoro	3.50
Capiz	3.08
Cavite	2.14
Cebu	1.94
Bohol	1.58
Antique	1.32
Ilocos Norte	1.32
Bulacan	1.11
Rizal	1.00
Nueva Ecija	.91
Sorsogon	.68
Pampanga	.57
Orient. Negros	.42
Masbate	.41
Tarlac	.41
Surigao	.35
Pangasinan	.26
Batangas	.17
Iloilo	.08
Bataan	.07
N. Vizcaya	.06
Occ. Negros	.06
Abra	.03
Ilocos Sur	.02
Laguna	.01
Tayabas	.01
Marinduque	.00
Misamis	.00
Palawan	.00
Romblon	.00
Zamboanga	.00

4.68	Iloilo
1.63	Cebu
1.45	Masbate
1.44	Bataan
1.40	Ilocos Sur
1.39	Isabela
1.35	Tayabas
1.28	Sorsogon
1.21	Zamboanga
1.09	Laguna
1.07	La Union
.99	Romblon
.97	Rizal
.96	Cagayan
.89	Occ. Negros
.88	Albay
.82	Cavite
.80	Pampanga
.79	Am. Camarines
.79	Misamis
.79	Tarlac
.78	Zambales
.76	Pangasinan
.75	N. Vizcaya
.72	Ilocos Norte
.72	Marinduque
.72	Orient. Negros
.67	Surigao
.65	Abra
.65	Palawan
.64	Leyte
.60	Bulacan
.60	Nueva Ecija
.56	Antique
.52	Capiz
.45	Mindoro
.40	Bohol
.36	Batangas
.33	Samar

Chart No.11.- Correlation Between Death Rate Per 1000 Population From Smallpox (Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

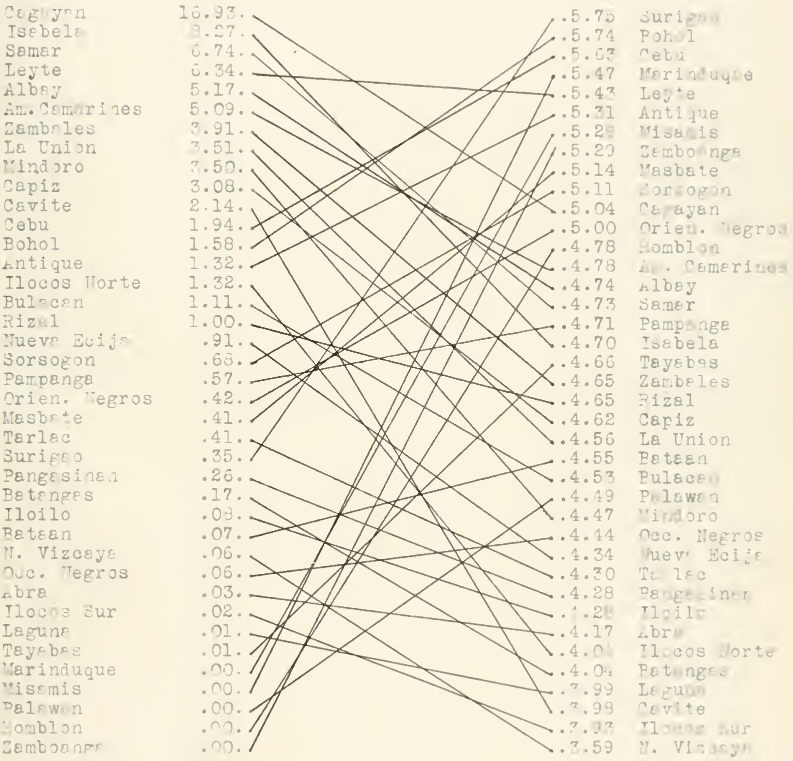


Chart No.12.- Correlation Between Death Rate Per 1000 Population From Smallpox (Left Column) and Average Number of Persons to A Dwelling (Right Column) in Certain Provinces in the Philippine Islands. Data From Tables 3 and 5.

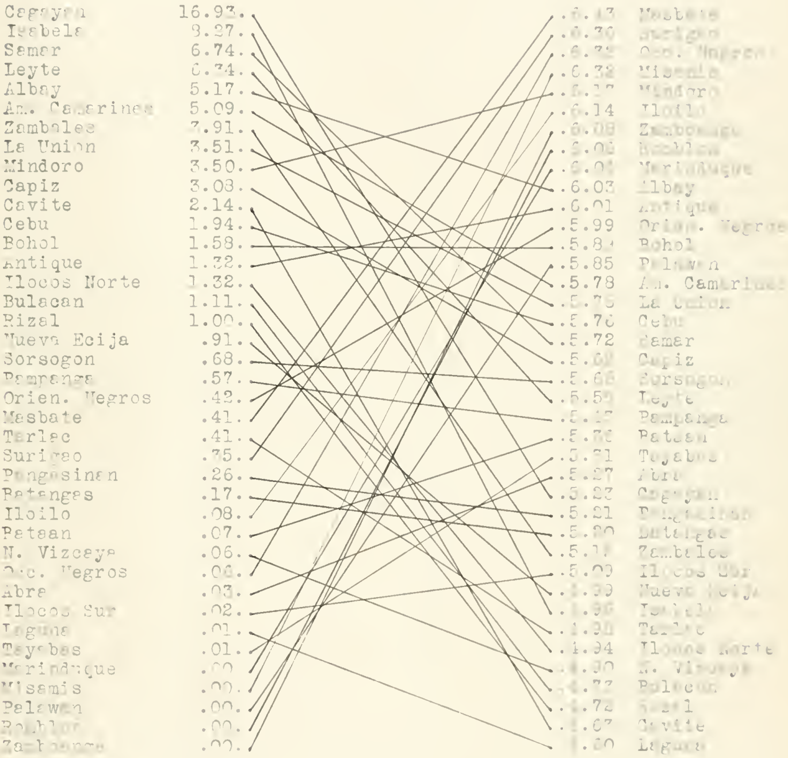


Chart No. 13.- Correlation Between Death Rate per 1000 Population from Asiatic Cholera (Left Column) and Value of Personal Property and Real Estate Per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

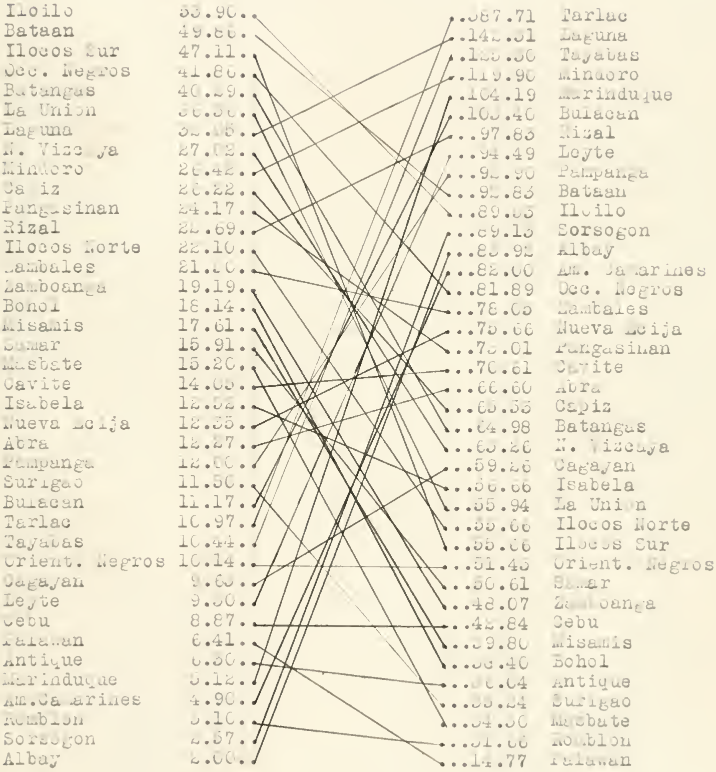


Chart No.14.-Correlation Between Death Rate per 1000 Population from Asiatic Cholera (Left Column) and Taxes Paid per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

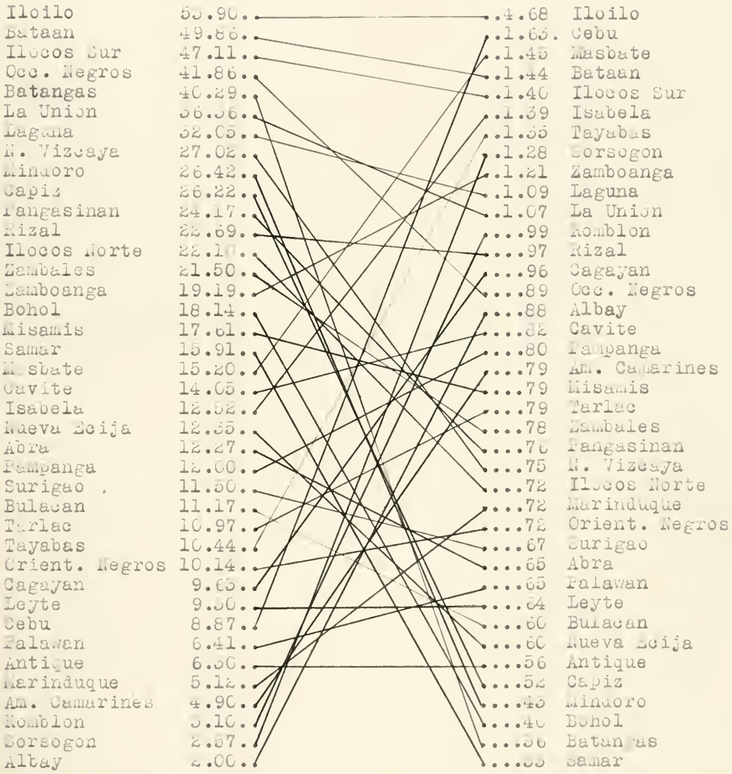


Chart No. 15.-Correlation Between Death Rate Per 1000 Population From Asiatic Cholera (Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

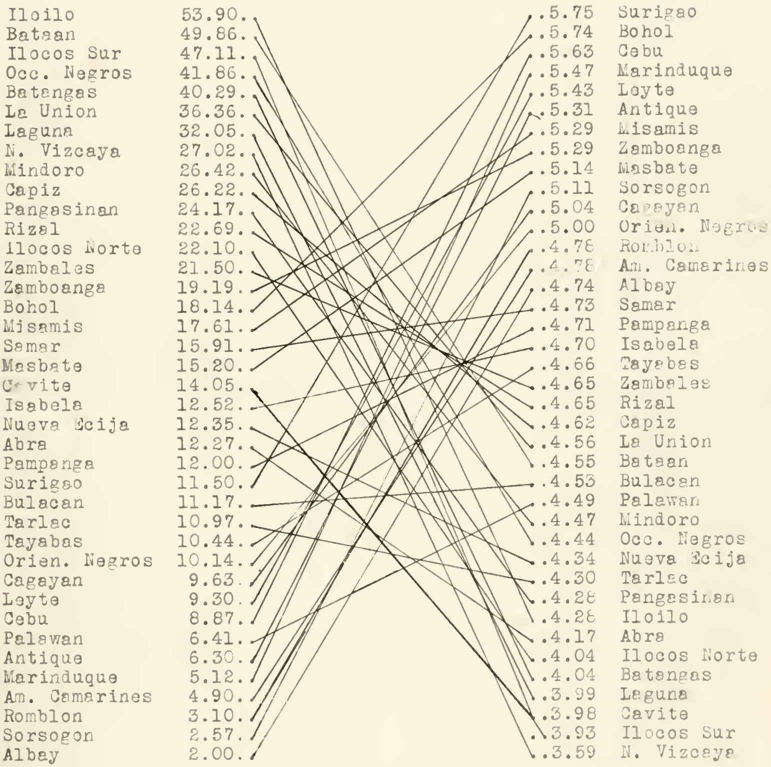


Chart No. 16.-Correlation Between Death Rate Per 1000 Population From Asiatic Cholera (Left Column) and Average Number of Persons to A Dwelling (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

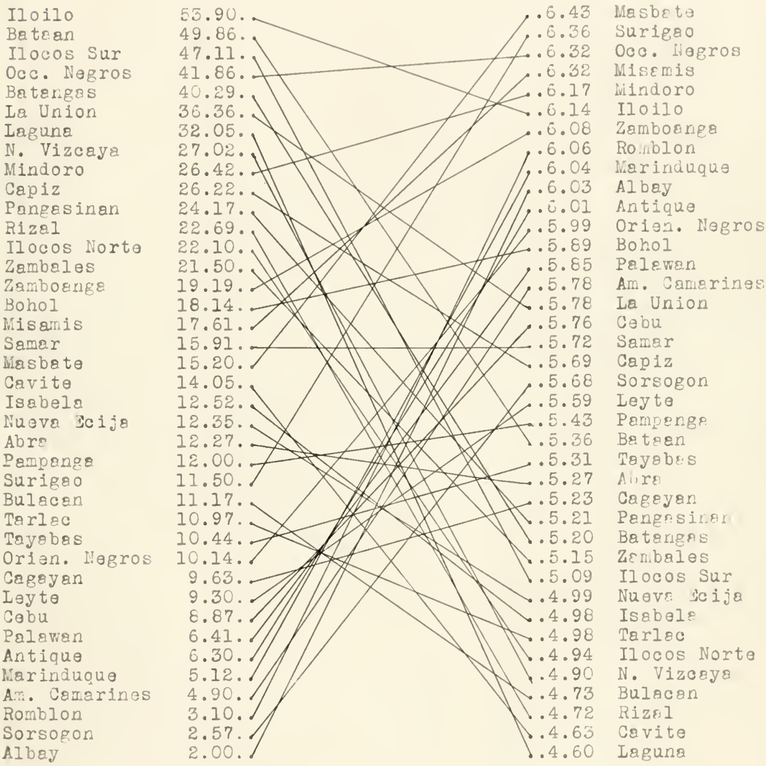


Chart No.17.- Correlation Between Death Rate per 1000 Population from Dysentery (Left Column) and Value of Personal Property and Real Estate per Capita)(Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

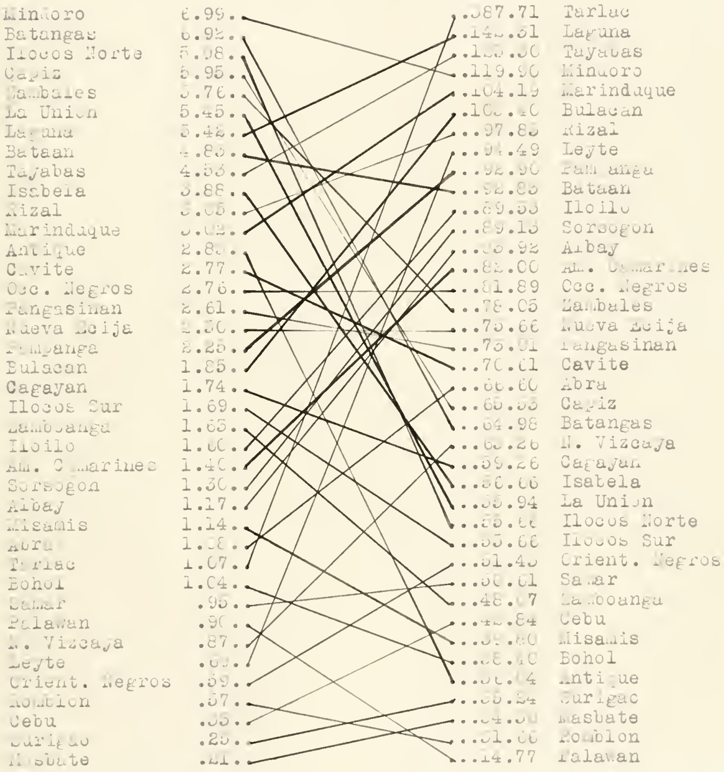


Chart No.18.-Correlation Between Death Rate per 1000 Population from Dysentery (Left Column) and Taxes Paid per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

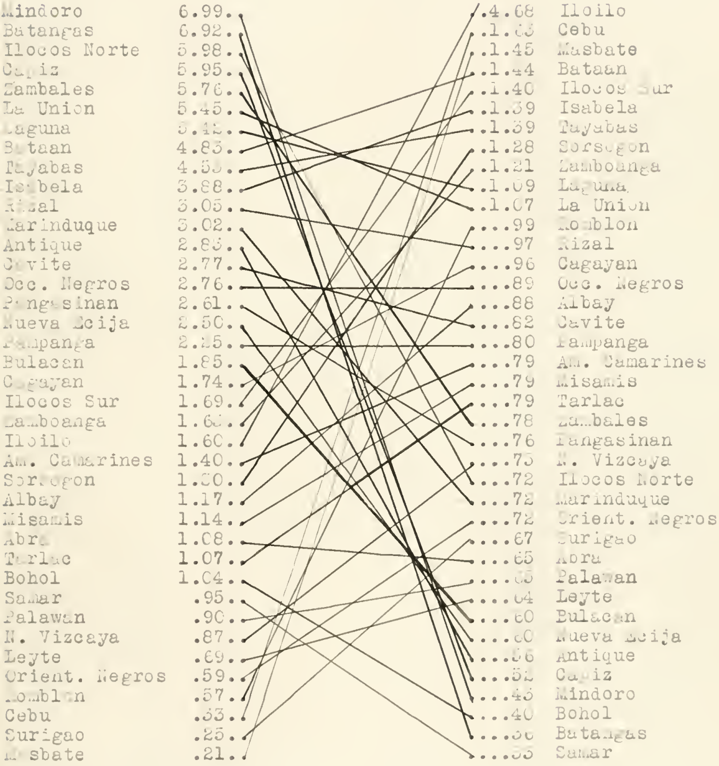


Chart No. 19.-Correlation Between Death Rate Per 1000 Population From Dysentery (Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

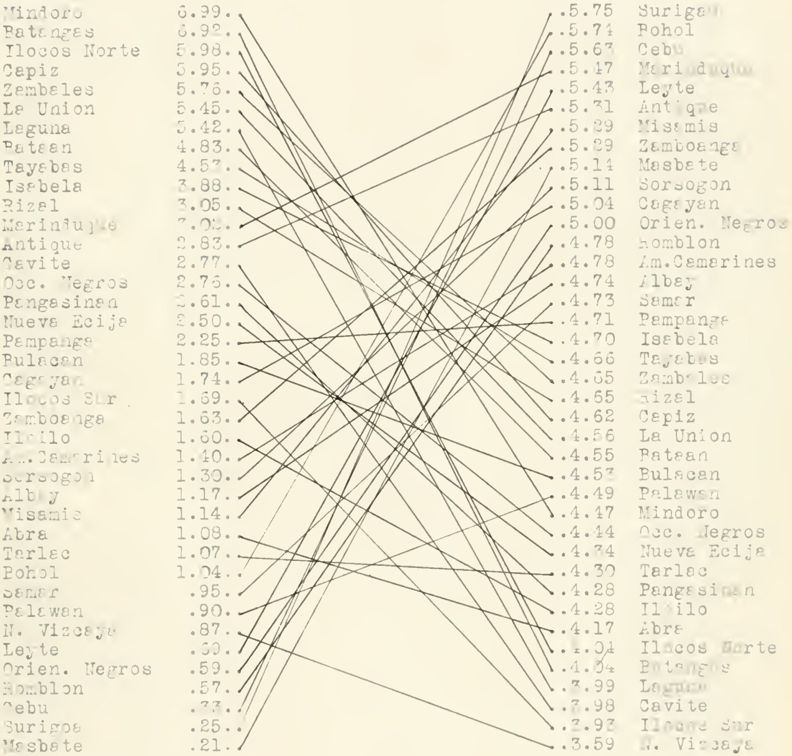


Chart No. 20.-Correlation Between Death Rate Per 1000 Population From Dysentery (Left Column) and Average Number of Persons to a Dwelling (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

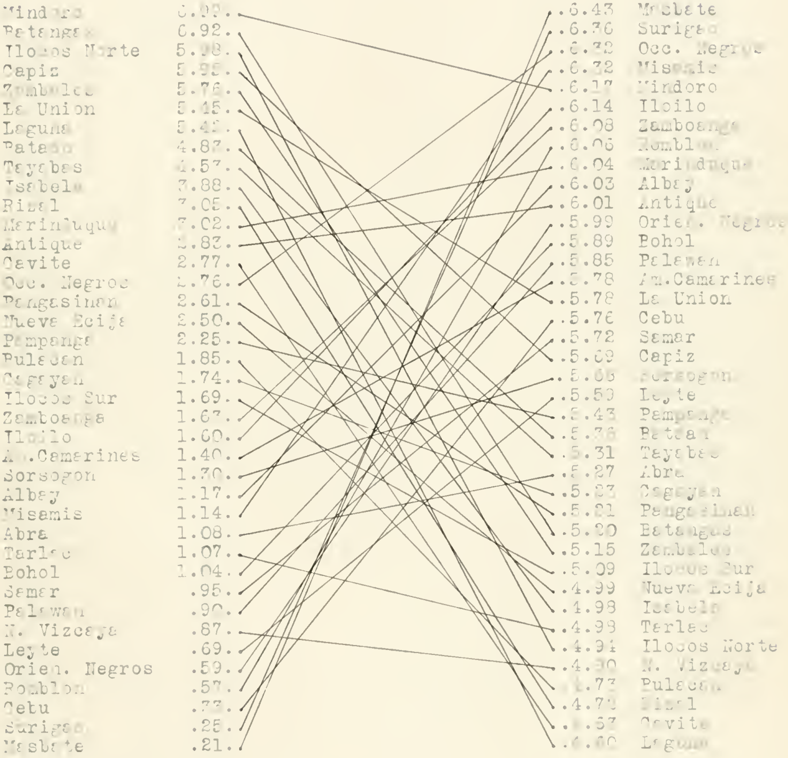


Chart No.21.- Correlation Between Death Rate per 1000 Population from Leprosy (Left Column) and Value of Personal Property and Real Estate per Capita (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables 3 and 4.

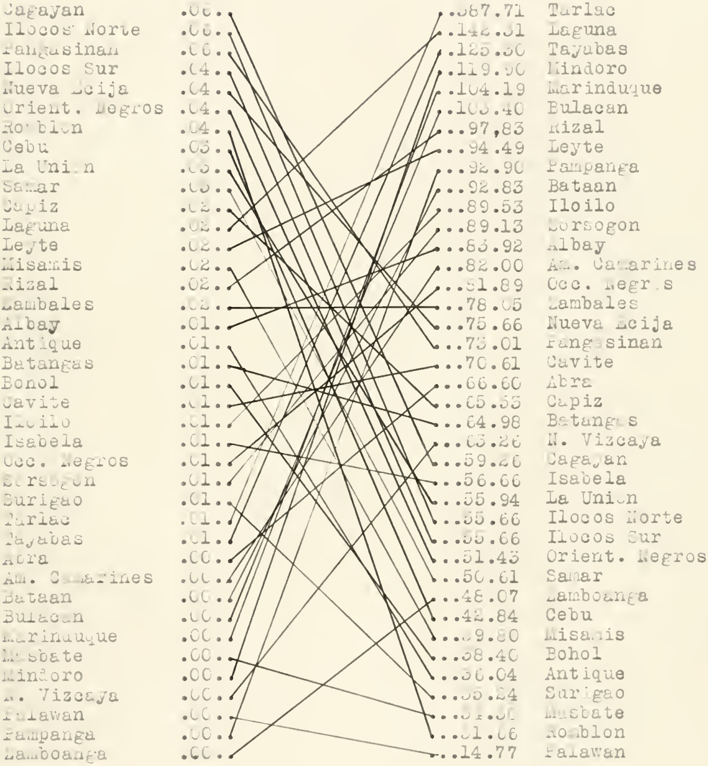


Chart No. 22.- Correlation Between Death Rate per 1000 Population from Leprosy (Left Column) and Taxes Paid per Capita, (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables 3 and 4.

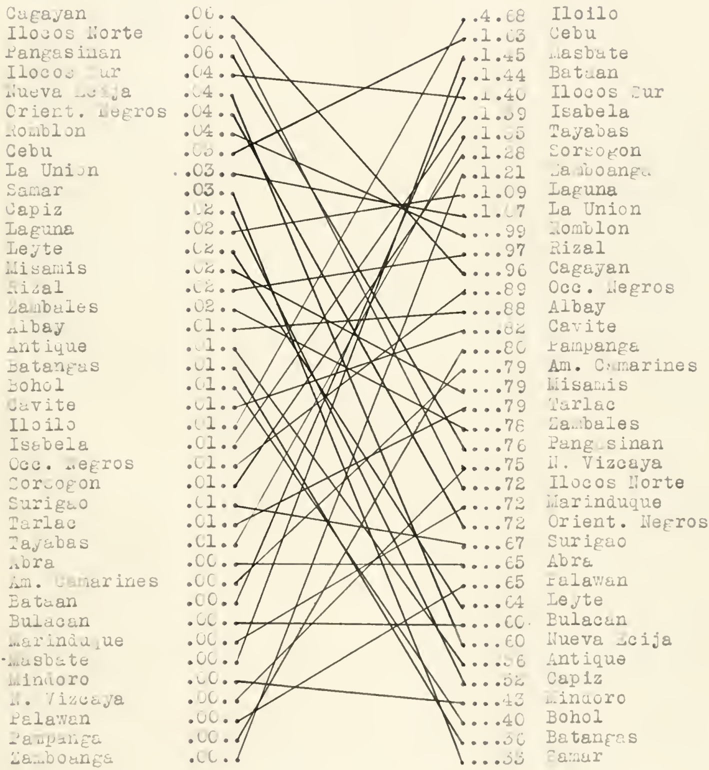


Chart No. 23.- Correlation Between Death Rate Per 1000 Population From Leprosy (Left Column) and Average Number of Persons to a Family (Right Column), in Certain Provinces of the Philippine Islands. Data from Tables Nos. 3 and 5.

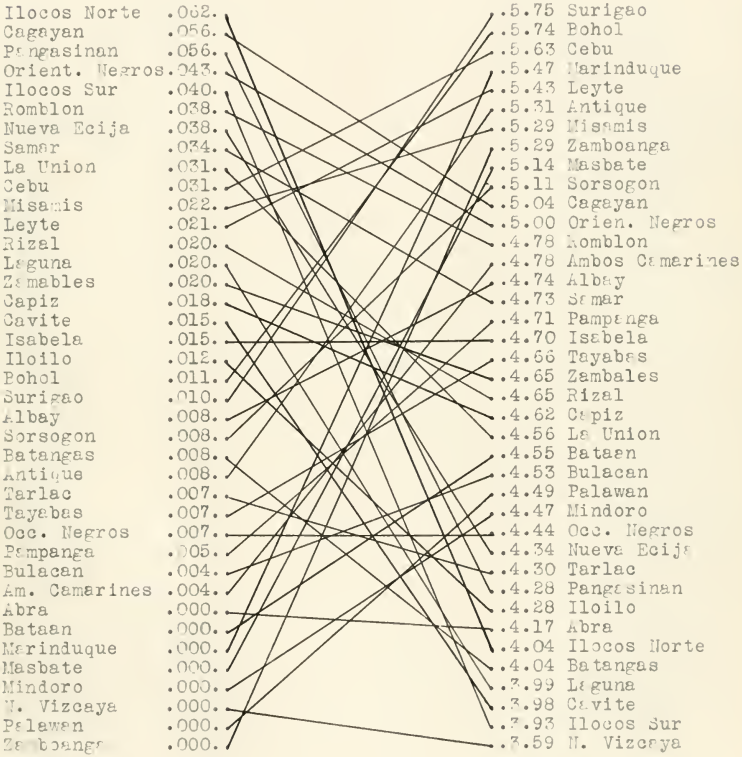


Chart No. 24.- Correlation Between Death Rate Per 1000 Population From Leprosy (Left Column) and Average Number of Persons to a Dwelling (Right Column), in Certain Provinces of the Philippine Islands. Data from Tables 3 and 5.

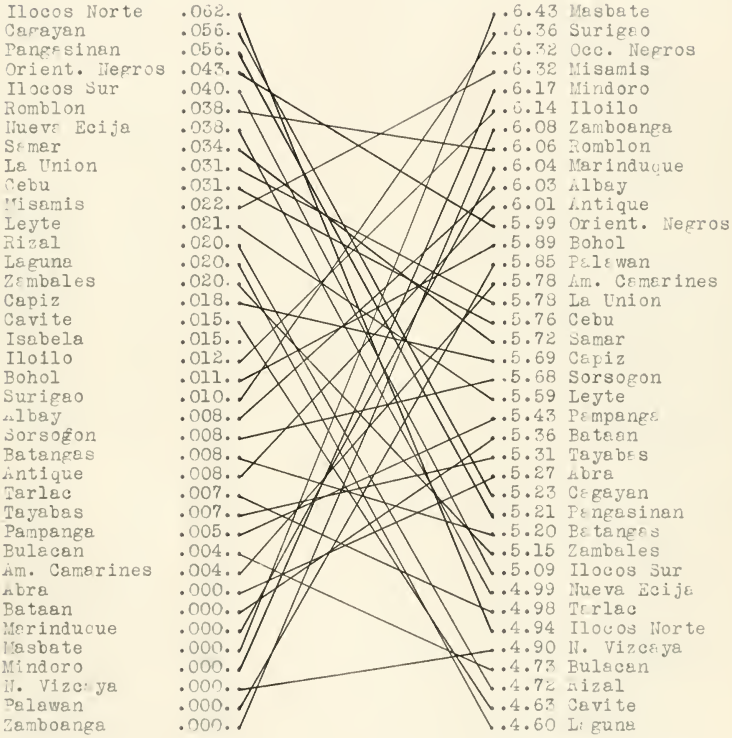


Chart No. 25.- Correlation Between Death Rate per 1000 Population from Beri-beri (Left Column) and Value of Personal Property and Real Estate per Capita (In Pesos) Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

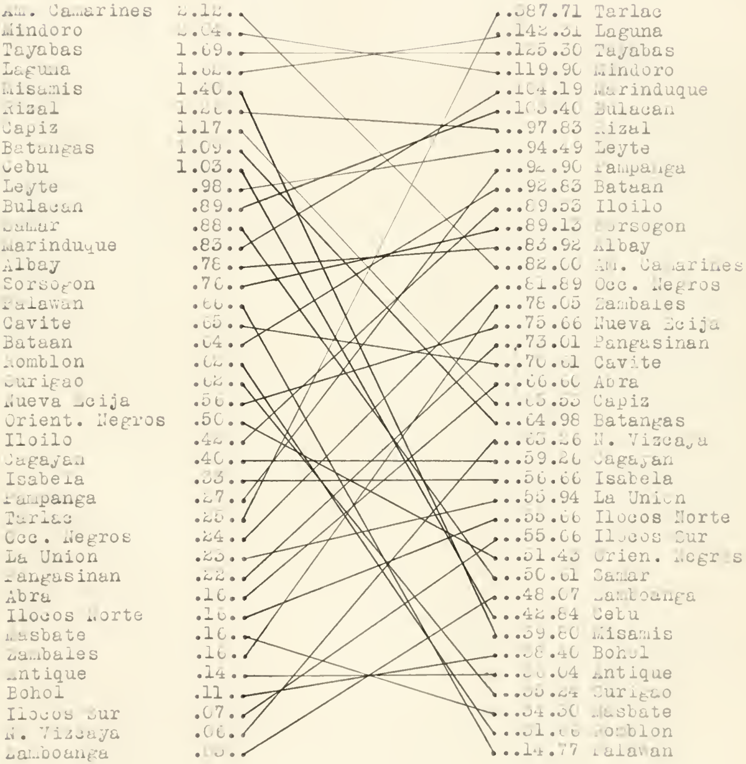


Chart No. 26.- Correlation Between Death Rate per 1000 Population from Beri-beri (Left Column) and Taxes Paid per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

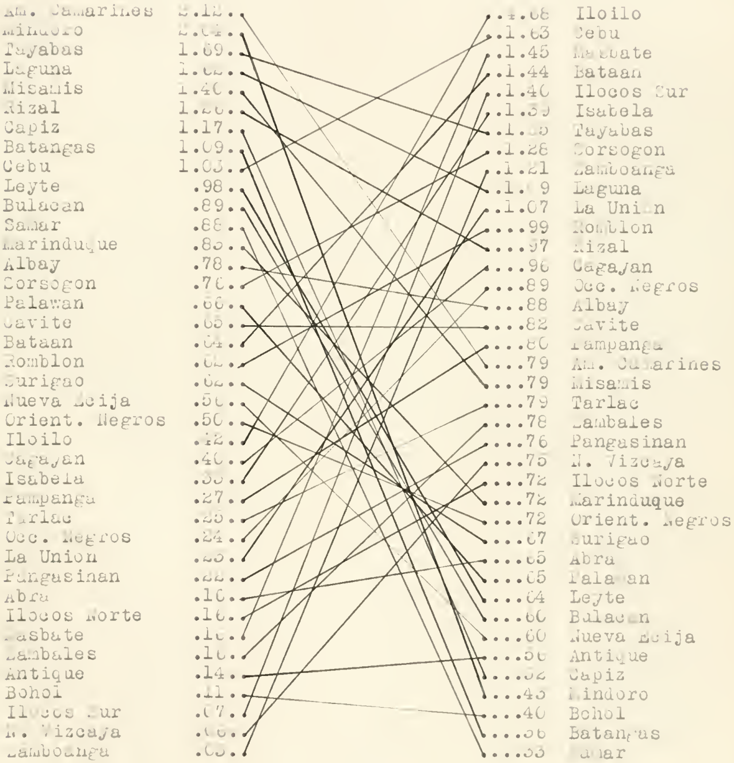


Chart No.27.-Correlation Between Death Rate Per 1000 Population From Beri-beri (Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

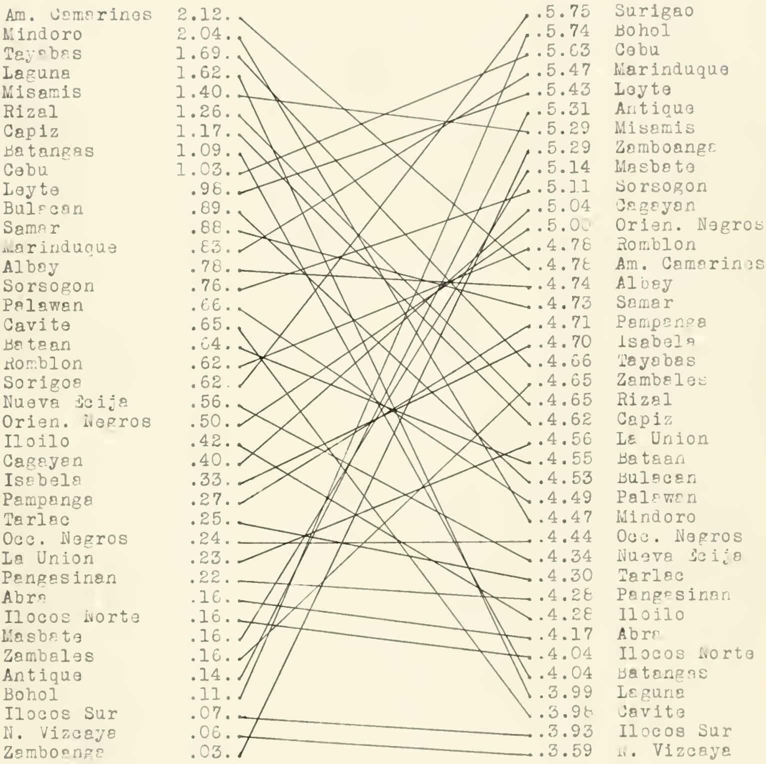


Chart No.28.-Correlation Between Death Rate per 1000 Population From Beri-beri (Left Column) and Average Number of persons to a Dwelling (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

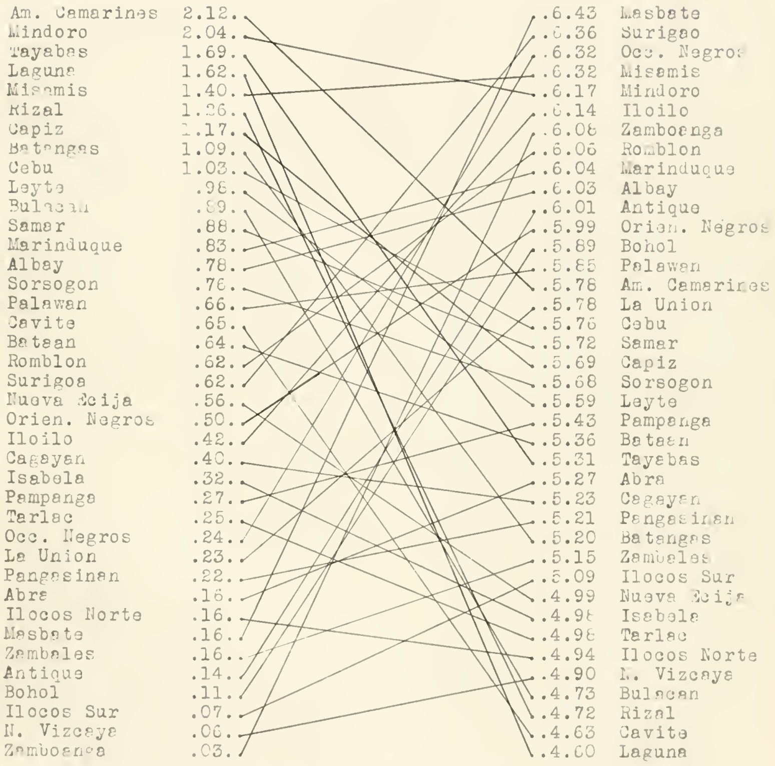


Chart No.29.- Correlation Between Death Rate per 1000 Population from Tuberculosis (Left Column) and Value of Personal Property and Real Estate per Capita (In Pesos) (Right Column) In Certain Provinces of the Philippine Islands. Data from Tables

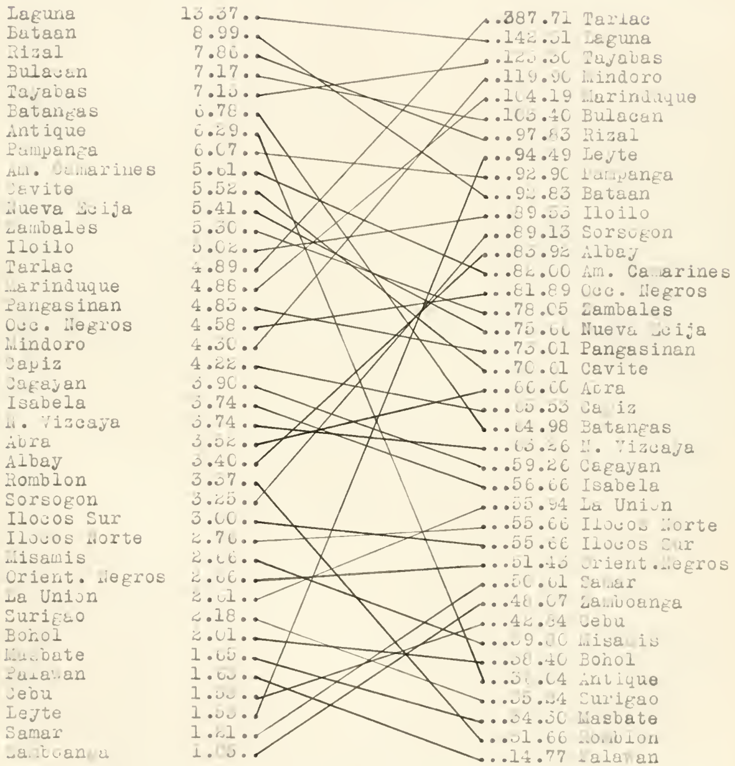


Chart No. 30.- Correlation Between Death Rate per 1000 Population from Tuberculosis (Left Column) and Taxes Paid per Capita (In Pesos) (Right Column), In Certain Provinces of the Philippine Islands. Data from Tables

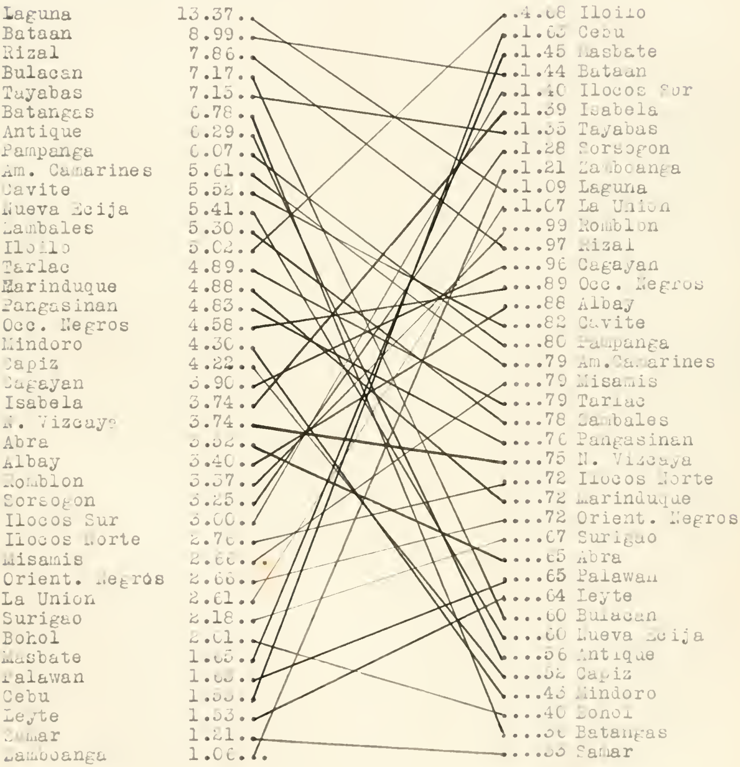


Chart No.31.- Correlation Between Death Rate Per 1000 Population From Tuberculosis (Left Column) and Average Number of Persons to a Family (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.

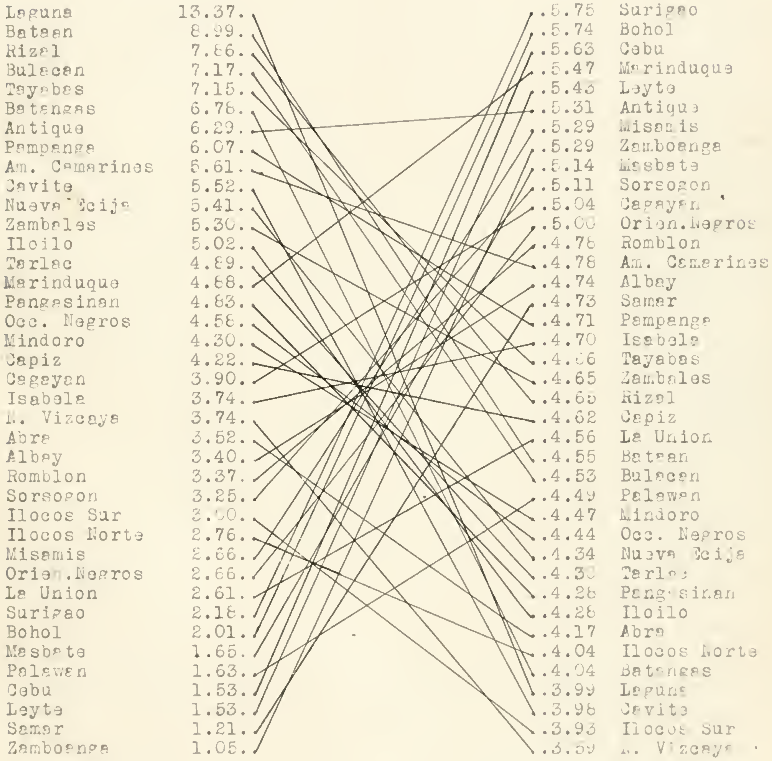


Chart No. 32.-Correlation Between Death Rate Per 1000 Population From Tuberculosis (Left Column) and Average Number of Persons to a Dwelling (Right Column) in Certain Provinces of the Philippine Islands. Data From Tables 3 and 5.